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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

MITCHELL, JAMES M

ART UNIT PAPER NUMBER

2827

DATE MAILED: 11/06/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/023,723

Applicant(s)

CHANDRAN ET AL.

Examiner

James Mitchell

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 January 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 7, 8, 18 and 23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear as to what is the exact adhesive strength.
3. Claims 7, 8, 18 and 23 have not been rejected over the prior art because, in light of the 35 U.S.C. 112 rejections supra, there is a great deal of confusion and uncertainty as to the proper interpretation of the limitations of the claims; hence, it would not be proper to reject the claims on the basis of prior art. As stated in *In re Steele*, 305 F.2d 859, 134 USPQ 292 (CCPA 1962), a rejection should not be based on considerable speculation about the meaning of terms employed in a claim or assumptions that must be made as to the scope of the claims. See also MPEP 2173.06.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Milewski et al. (U.S. 6,162,660)

6. Milewski (Fig 5A) discloses a substrate (21) a die (10), a plurality of interconnections between the substrate and die (10), wherein respective ones of the interconnections include a relatively low melting temperature (39) and yield strength solder on the die, a relatively higher melting temperature and electrically conductive, copper material (51) in the form of a bump on the substrate, and an inherent soldered joint connecting the solder to the electrically conductive material, wherein the relatively higher melting temperature and electrically conductive material (51) on the substrate is formed as a standoff extending above a surface of the substrate, and a top surface of the standoff is inherently wetted by the solder to form the solder joint (Column 5, Lines 42-43).

7. Claims 1, 6, 7, 19-22, 25 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamamoto (JP 10-12659).

Yamamoto (Fig 8) discloses a semiconductor package and method of interconnecting a die and substrate to one another for reduced die stresses, comprising: a substrate (32) a die (21), an inherent plurality of interconnections between the substrate and said die, wherein respective ones of the interconnections include inherently providing a relatively low melting temperature solder (29) and yield strength solder on the die, a relatively higher melting temperature and electrically conductive solder material (36) in the form of a bump on the substrate, and an inherent soldered joint connecting the solder to the electrically conductive material; an inter layer of dielectric material (34) under the interconnection; inherently forming a soldered joint connecting the solder to the electrically conductive material (33, 23; via melting of solder); wherein the contact

member (33) forms a standoff extending above a surface of the substrate), an inherent solder joint (via melting of layer 29); and said solder is wetted onto a surface of the contact member of the substrate; inherently heating the die and solder to at least the a soldering temperature.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 9-17, 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto in combination with Dalal (JP08-332590).

11. The prior art discloses the elements stated in paragraph 7 and a die with an inherent thermal expansion of at least 2.7 ppm/°C (admitted by applicant page 11, Line 2), wherein contact members (33) are connected to said die by soldered members

(29,36) coupling the die to said substrate, said contact member comprises said high melting point solder that is inherently a standoff that is non-melting at the solder liquidous temperature of the low temperature solder (29; English Solution).

12. Yamamoto does not appear to disclose that the substrate has a thermal expansion of $15 \text{ ppm}/^{\circ}\text{C}$ that is two times greater than the thermal expansion of the die.

13. However Dalal utilizes a ceramic substrate inherently at $15 \text{ ppm}/^{\circ}\text{C}$ (as admitted by applicant Page 11).

14. It would have been obvious to one of ordinary skill in the art to form the substrate of Yamamoto of ceramic with a thermal expansion of $15 \text{ ppm}/^{\circ}\text{C}$, in order to provide a substrate as taught by Dalal (English Solution).

15. With respect to claim 15, examiner takes official notice that it would have been obvious to one of ordinary skill in the art to the conductive member from copper in order to provide conductivity.

16. Further, forming the conductive member of copper would have been obvious, since it has been held that to be within the general skill of a worker in the art to select known material on the basis of its suitability for intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416 (1960).

Conclusion

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Mitchell whose telephone number is (703) 305-0244. The examiner can normally be reached on M-F 10:30-8:00.


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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (703) 305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3230 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

jmm
October 1, 2002


ALBERT W. PALADINI
PRIMARY EXAMINER